This rendering shows what 34 S. 11th St. in Philadelphia, Pa., will look like when it is completed by Clemens Construction Co. High-performance insulated architectural precast concrete panels were used to reclad the structure. Courtesy of 34 S. 11th Street at East Market, copyright BLT Architects.

Mixed-use rehabilitation project benefits from precast concrete

High-performance insulated architectural precast concrete panels were chosen to reclad an aging eight-story building at 34 S. 11th St. in Philadelphia, Pa. Formerly a warehouse, the building is being converted into a mixed-use facility with retail and commercial spaces by Clemens Construction Co. of Philadelphia, Pa. The project represents the first phase in the $500 million East Market redevelopment, and the owners wanted to set the proper aesthetic tone within their budget.

The building's facade was removed to expose the concrete structure and was then reclad with the precast concrete panels, which feature a lightly sandblasted, deep charcoal exterior finish.

Designers at BLT Architects and Morris Adjmi Architects selected the panels as a way to take advantage of the building's 14 ft (4.3 m) high ceilings in the repurposing. "The architects were very involved with the detailing and mockups during the engineering/submittal process," says Sean McMullan, senior project manager with Clemens Construction Co., the contractor for the project.

The design concept features large windows framed with precast concrete in order to create a contemporary look with a dramatic visual effect.

The 11 in. (208 mm) thick panels, fabricated by Coreslab Structures, include an exterior 4 in. (100 mm) layer of polyisocyanurate insulation, manufactured by Thermomass. The panels also feature 3 in. (76 mm) finned projections.

Although adding precast concrete panels to an older building in this congested urban location was no easy task, the owners agreed that it would be worth the effort.

"It was a challenge to get the precast panels to the actual building," McMullan says. "About 90% of the panel installations occurred at night so that the street could be shut down. We were able to get about three pieces on each flatbed." McMullan says it was difficult to maneuver the trucks and panels into the right places on the street so that the crane could lift them into place for mounting.

Another challenge related to mounting the panels onto the existing structure. For one thing, the panels weigh anywhere from 16,000 to 32,000 lb (71 to 140 kN). For another, the bays on the older building did not offer a lot of consistency in shape and size.

"A lot of the panels had to be different shapes and sizes in order to match the different bays," McMullan says. "It was not a matter of putting up similar panels in the exact same way each time in each bay." In addition, some of the bays had to be slightly modified in order to get the panels to fit properly.

As of late May 2016, all of the precast concrete panels were in place on the building with the exception of a few additional

Precast concrete was used to reclad the eight-story building at 34 S. 11th St. in Philadelphia as part of the East Market rehabilitation project.

pieces that will be installed on the lower west side of the building in late June.

Though the rehabilitation project is not complete, McMullan reports that there have been a lot of positive comments about the building's new look. "It looks fantastic," he says.
—William Atkinson

Precast concrete highway repair panels save time, money

Medhi Parvini, a senior transportation engineer with the California Department of Transportation (Caltrans), presented the paper "Caltrans Policy and Standards for Evaluation, Design, and Construction of Precast Concrete Pavement" at the 2016 PCI Convention and Bridge Exhibition in Nashville, Tenn., this past spring. Among the projects he discussed was one involving the manufacturing and installation of almost 1800 precast concrete repair panels along US Route 101 in California that has been reaping significant savings in time and money.

Route 101 is a north-south highway that runs through California, Oregon, and Washington. The southern terminus is in Los Angeles, Calif., at the East Los Angeles Interchange, the world's busiest freeway interchange. The Los Angeles portion of the highway mostly consists of four lanes in each direction. The existing jointed concrete pavement was constructed in the 1950s.

District 7 of Caltrans opted for precast concrete panels as part of a massive repair project along a section of the highway in 2015 and 2016. The primary focus has been along the two outside distressed truck lanes in each direction.

The project called for precast jointed concrete pavement (PJCP) at several locations along the highway. PJCP panels were cast and cured at a plant off-site and then trucked to the construction location and installed using a crane.

The idea was to help reduce closure times and maintenance costs. "The high traffic volume on this highway does not allow the department to close the highway for an extended time," Parvini says. "Therefore, an accelerated pavement construction strategy such as precast concrete pavement was chosen."

Work on the project included panel fabrication (including pretensioning), existing pavement and base removal, repair-area preparation, installation of the panels and bedding system, and installation of load transfers at transverse joints.

More than 90% of the paving job has been done using precast concrete panels. The first panel was installed in July 2015. A total of 1773 precast concrete panels have been installed. "In order to streamline the production and expedite the installation, an effort was made to fix the precast panel dimensions," he says. "For this project, panels were generally 12 feet wide by 16 feet long."

How did they determine where it made sense to use the precast concrete panels along the highway and where it didn't? "When effective traffic management with an extended lane closure was not an option, precast concrete pavement was used,"

A crane lowers a precast jointed concrete panel into place during the repair of US Route 101 in California.

Parvini says. "If lane closure for the duration of conventional concrete curing was acceptable, a cast-in-place concrete pavement was used. Construction work was limited to about eight hours for only two weekend nights—Friday and Saturday."

The main benefit of precast concrete pavement technology, Parvini says, is rapid construction with a durable product. "This means improved safety for construction crews, less inconvenience for public users, and a more cost-effective project for the taxpayers," he says.

While the project continues to be an unqualified success, there has been one challenge. "Precast concrete pavement is a relatively new technology, and California is leading this technology," Parvini says. "One of the biggest challenges has been increasing the level of expertise by providing more training to the department staff and contractors in order to improve the quality of installation of the final product."

The work involves a number of steps:

1. Pre–saw cut the repair areas a few nights before installation.
2. Remove existing pavement.
3. Prepare the base.
4. Attach foam boards (filler boards) along the transverse and longitudinal joint faces.
5. Install precast concrete panels.
6. Inject bedding grout under the panels.
7. Apply polyester grout into the dowel bar slots.
8. Fill the longitudinal joint gap with bedding grout.
9. Seal the joints.
10. Grind the roadway surface.

"Our experience has shown that we have had very few issues with the panel manufacturing," Parvini says. "We have knowledgeable inspectors in each plant overseeing the production."

But panel installation and placement is new to both the pavement contractors and inspectors. "This is the area that we have seen more issues in our project, suggesting that we needed to do more training," Parvini says. "While we are focusing our improvement efforts mainly on the latter, when it comes to more general user perspective, the quality of the final product—the installed panels—is what really matters."
—William Atkinson